

# Rivers: Our National Water Resource

**Ages: 8+**      **Players: 2-4**

**To win:** The game ends once all of the water tokens have been allocated/used. Each player should add up their points from the Land Use cards and/or their unallocated water tokens. The player with the most points is the winner.

## Setup:

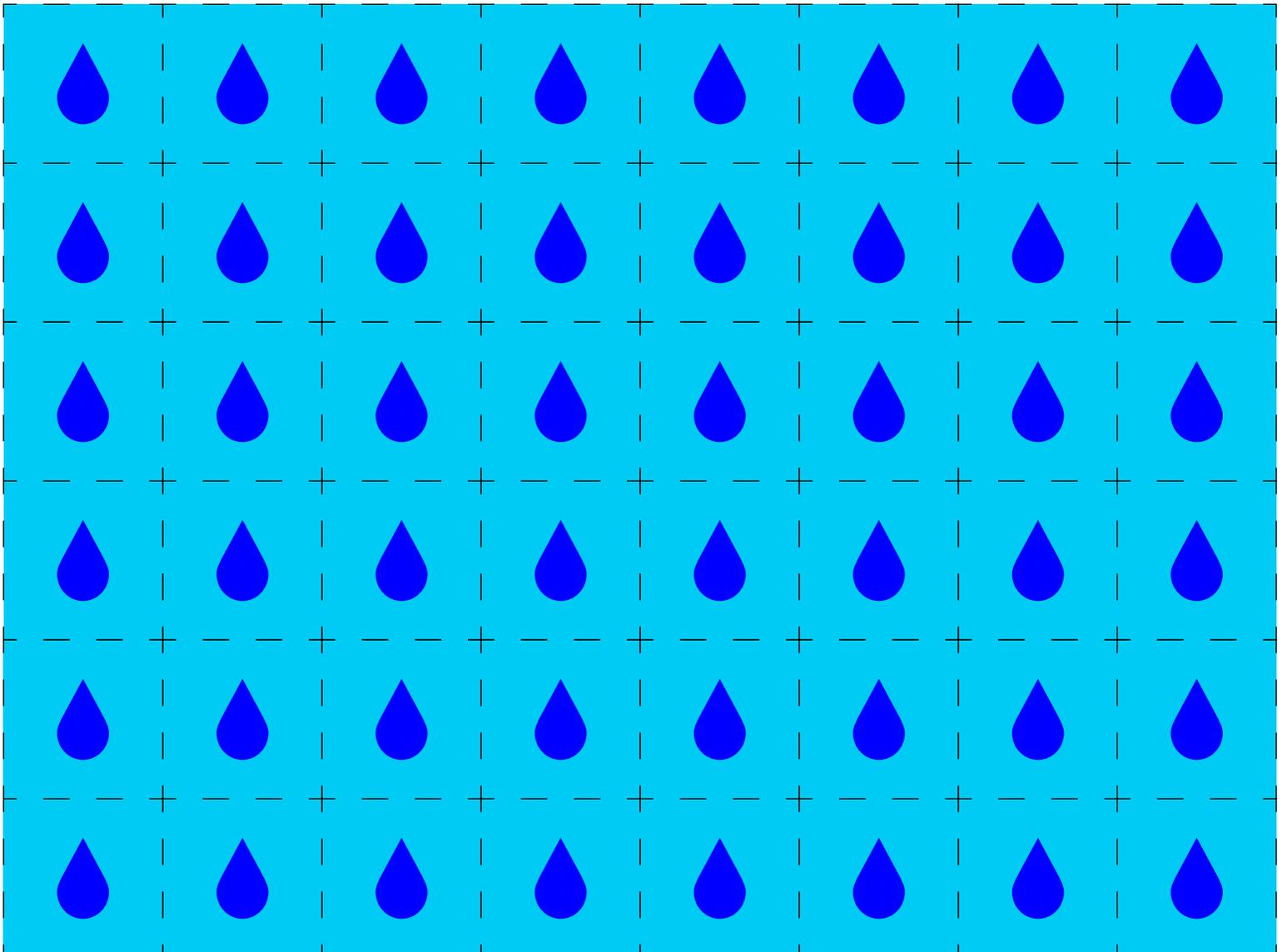
1. Distribute 5 clean water tokens (blue side up) to each player and place the remaining clean water tokens in the Global Water Supply.
2. Place cards face-down on board in the corresponding boxes. Shuffle before game play.
3. Place disaster tiles in space on board next to Land Use Cards.
4. Place all player pieces on start.

## Game Points:

1. Each clean water token (blue water drop) is worth +1 point, and each polluted water token (brown water drop, the reverse side of clean water) is worth -1 points.
2. Each Land Use card has a unique game point value. Land Use cards with any polluted water tokens do not count toward game points. However, their individual water tokens still do.
3. When Habitat Land Use cards are paired with their companion Land Use card, it doubles the game point value of that Land Use card:
  - Wetlands are paired with Industrial areas to help clean water.
  - Vegetated Streambanks are paired with Farms to help protect rivers from run-off.
  - Green spaces are paired with Urban areas to make them healthier for humans and animals.

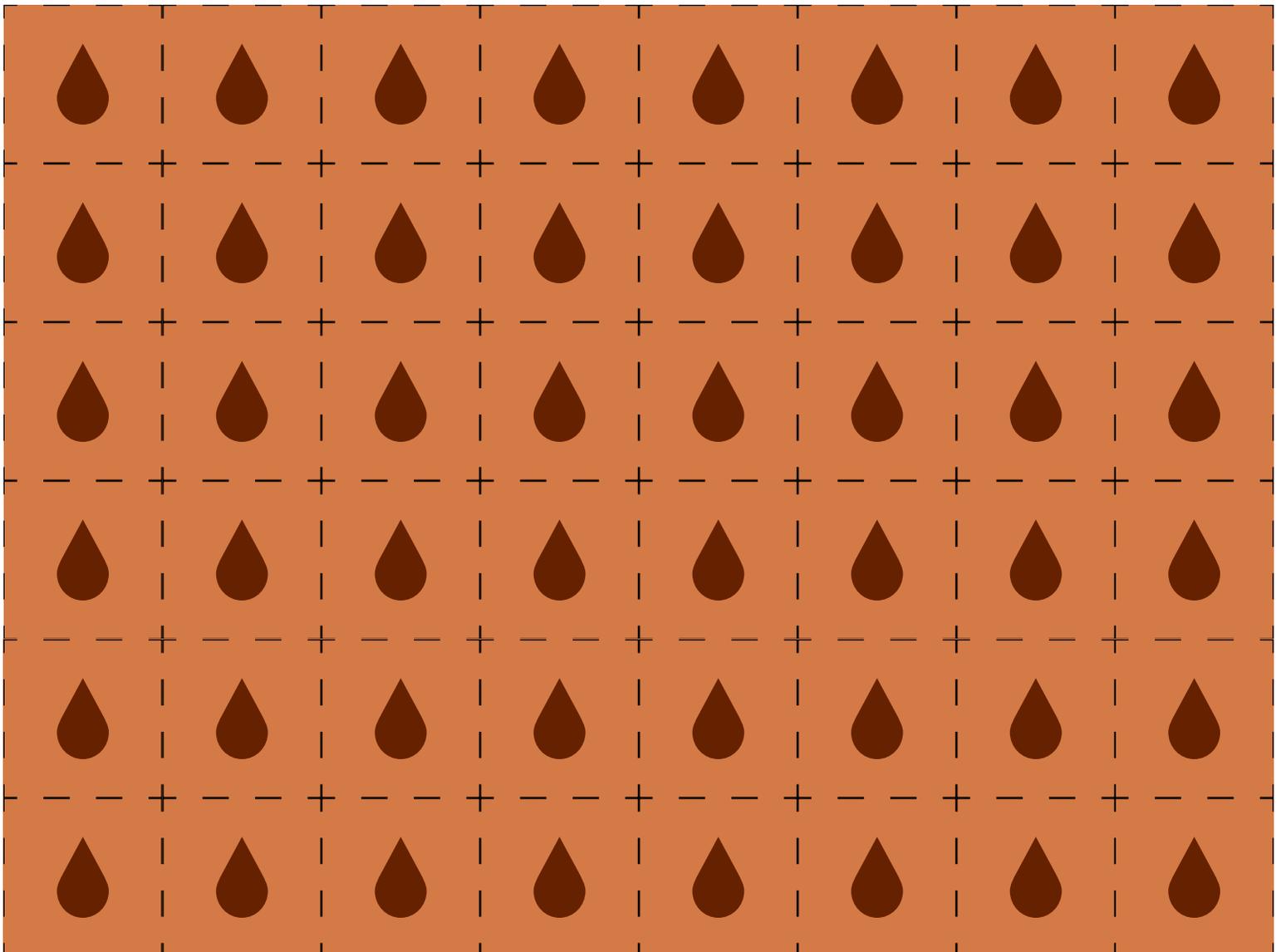
## Materials:

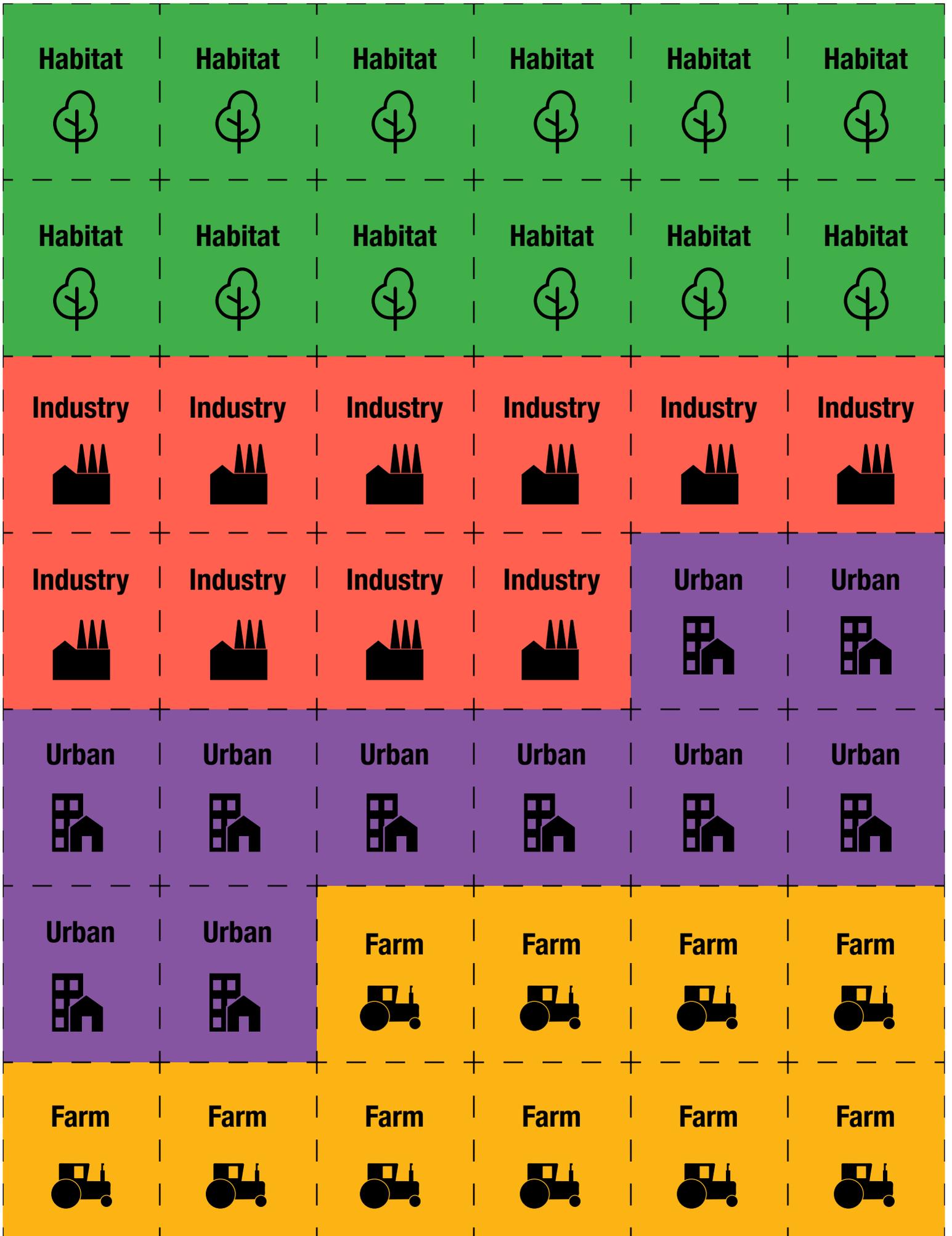
- Game board
- 4 disaster tiles
- 48 event cards
- 42 Land Use cards
- 76 two-sided water tokens
- 1 player piece per player (use any small item like a coin or piece of colored paper)
- 1 six-sided die



## To Play:

1. Youngest player begins. Each turn, the player rolls the die and moves that number of spaces. (Multiple players can occupy the same space.)
2. Player draws an event card and follows the instructions.
  - a. If a player is unable to follow the event card instructions, simply discard face-up. If a player draws an event card labeled "Innovation", that player hold onto that card and applies the effect to their hand for the rest of the game.
  - b. If you don't have enough water tokens to follow the card, skip your next turn.
3. Check the space for a Land Use icon (small circle above or below the space) representing water utilization.
  - a. If you land on a space with a Land Use icon, draw 3 cards from the matching pile and select only 1 to purchase. Landing on a WILD icon allows you to choose which Land Use pile to pick 3 cards from (still only choosing one to purchase).
  - b. The number of clean water tokens stated on the back of the Land Use card must be allocated towards that card throughout the entire game. Allocate the tokens by placing them on your face-down purchased Land Use card.
3. If you land on a disaster space (spaces outlined in red), place the corresponding disaster tile on that space, roll the die, and follow the disaster scale.
4. Whenever players pass START, they collect 5 clean water tokens, and all of the disaster tiles are removed from the board. They can be played again if a player lands on a disaster space.
5. There are 9 corner spaces (not including START) that have special actions. Read what the space says and follow its instructions. To clean a water token, flip the token from polluted (brown) to clean (blue).





<p><b>Vegetation Zone</b> Provides a protective buffer between farms and waterways.</p> <p>Water Cost: 2 Game Points: 4 Pairs with Farms</p>	<p><b>Vegetation Zone</b> Provides a protective buffer between farms and waterways.</p> <p>Water Cost: 2 Game Points: 4 Pairs with Farms</p>	<p><b>Constructed Wetland</b> Mimics natural wetlands to treat wastewater.</p> <p>Water Cost: 2 Game Points: 4 Pairs with Industry</p>	<p><b>Parks</b> Provide healthy recreation areas for citizens to enjoy.</p> <p>Water Cost: 2 Game Points: 4 Pairs with Urban</p>	<p><b>Parks</b> Provide healthy recreation areas for citizens to enjoy.</p> <p>Water Cost: 2 Game Points: 4 Pairs with Urban</p>	<p><b>Parks</b> Provide healthy recreation areas for citizens to enjoy.</p> <p>Water Cost: 2 Game Points: 4 Pairs with Urban</p>
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<p><b>Automobile industry</b> 39,000 gallons of water are used to make an average size car.</p> <p>Water Cost: 4 Game Points: 6</p>	<p><b>Food Processing</b> A 5-pound bag of sugar uses about 88 gallons of water.</p> <p>Water Cost: 3 Game Points: 5</p>	<p><b>Bottling plant</b> It takes 180-328 gallons of water to produce a 2-liter bottle of soda.</p> <p>Water Cost: 5 Game Points: 8</p>	<p><b>Textile Industry</b> About 8,000 gallons of water are used to make a pair of jeans.</p> <p>Water Cost: 2 Game Points: 5</p>	<p><b>Automobile industry</b> 39,000 gallons of water are used to make an average size car.</p> <p>Water Cost: 4 Game Points: 6</p>	<p><b>Food Processing</b> A 5-pound bag of sugar uses about 88 gallons of water.</p> <p>Water Cost: 3 Game Points: 5</p>
<p><b>Town</b> An average American family uses more than 300 gallons of water per day.</p> <p>Water Cost: 1 Game Points: 2</p>	<p><b>Metropolitan</b> 80% of the U.S. water use occurs in metro areas.</p> <p>Water Cost: 2 Game Points: 4</p>	<p><b>Paper Mill</b> Six gallons of water are used to make a pound of paper.</p> <p>Water Cost: 5 Game Points: 7</p>	<p><b>Microchip Plant</b> It takes 4.8 million gallons per day to make computer chips.</p> <p>Water Cost: 6 Game Points: 11</p>	<p><b>Microchip Plant</b> It takes 4.8 million gallons per day to make computer chips.</p> <p>Water Cost: 6 Game Points: 11</p>	<p><b>Textile Industry</b> About 8,000 gallons of water are used to make a pair of jeans.</p> <p>Water Cost: 2 Game Points: 5</p>
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<p><b>Almond Orchard</b> It takes 1,900 gallons of water to produce one pound of almonds.</p> <p>Water Cost: 5 Game Points: 8</p>	<p><b>Corn Farm</b> It takes 127 gallons of water to produce one pound of corn.</p> <p>Water Cost: 3 Game Points: 5</p>	<p><b>Soybean Crop</b> One pound of soybeans requires 257 gallons of water.</p> <p>Water Cost: 3 Game Points: 6</p>	<p><b>Livestock</b> Cattle can require up to 30 gallons of water a day.</p> <p>Water Cost: 4 Game Points: 6</p>	<p><b>Suburb</b> Residents use 30 to 60 percent of urban fresh water on lawns.</p> <p>Water Cost: 3 Game Points: 6</p>	<p><b>City</b> A million people use about 30 billion gallons of water per year.</p> <p>Water Cost: 4 Game Points: 9</p>
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<p><b>Small Tributary</b></p> <p>Tributaries deliver upstream water and runoff.</p> <p>Roll 1-5: Get 1 clean water Roll 6: Get 1 polluted water</p>	<p><b>Drought</b></p> <p>Drought requires additional groundwater pumping for irrigation.</p> <p>Add 1 additional clean water token to each Farm card</p>	<p><b>Overflow</b></p> <p>Sewer overflow pollutes storm water.</p> <p>Collect 2 polluted water tokens.</p>	<p><b>Septic Failure</b></p> <p>Damaged septic tanks leak untreated sewage to the surface.</p> <p>Pollute 1 water token for every Urban card owned.</p>	<p><b>Residential Runoff</b></p> <p>Residential runoff washes fertilizer and street pollution into local stream.</p> <p>Pollute 2 water tokens for each Urban card owned.</p>
<p><b>Large Tributary</b></p> <p>Tributaries deliver upstream water and runoff.</p> <p>Roll 1-4: Get 1 clean water Roll 5-6: Get 1 polluted water</p>	<p><b>Industrial waste</b></p> <p>Industrial waste is dumped into local stream.</p> <p>Pollute 4 water tokens for each Industry card owned.</p>	<p><b>Pump &amp; Treat</b></p> <p>Contaminated water is treated before being released into the environment.</p> <p>Clean 3 water tokens for each Industry card owned</p>	<p><b>Well</b></p> <p>Wells provide drinking water and irrigation.</p> <p>Collect 1 clean water token.</p>	<p><b>Wetland</b></p> <p>Wetlands filter pollution and provide fish habitat.</p> <p>Collect 2 clean water for each Habitat card owned</p>
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<p><b>Agriculture Runoff</b></p> <p>Agricultural runoff carries excess nitrogen into nearby lake, causing an algal bloom.</p> <p>Pollute 2 water tokens for each farm owned</p>	<p><b>Agriculture Runoff</b></p> <p>Agricultural runoff carries excess nitrogen into nearby lake, causing an algal bloom.</p> <p>Pollute 2 water tokens for each farm owned</p>	<p><b>Dam</b></p> <p>Dams create reservoirs but slow the movement of water.</p> <p>Collect 2 clean water and skip your next turn</p>	<p><b>Wetland</b></p> <p>Wetlands filter pollution and provide fish habitat.</p> <p>Collect 2 clean water for each Habitat card owned</p>	<p><b>Residential Runoff</b></p> <p>Residential runoff washes fertilizer and street pollution into local stream.</p> <p>Pollute 2 water tokens for each Urban card owned</p>
<p><b>Wastewater Treatment</b></p> <p>Removes pollutants before reaching environment and reduces residential runoff.</p> <p>Clean 1 water token on each Urban card</p>	<p><b>Agriculture Runoff</b></p> <p>Agricultural runoff carries excess nitrogen into nearby lake, causing an algal bloom.</p> <p>Pollute 2 water tokens for each Farm owned</p>	<p><b>Heavy Rain</b></p> <p>Heavy rains replenish reservoirs and cause flooding.</p> <p>Collect 2 clean water &amp; if you have more than 10, flip 3 tokens to polluted water</p>	<p><b>Agriculture Runoff</b></p> <p>Agricultural runoff carries excess nitrogen into nearby lake, causing an algal bloom.</p> <p>Pollute 2 water tokens for each farm owned</p>	<p><b>Well</b></p> <p>Wells provide drinking water and irrigation.</p> <p>Collect 1 clean water</p>
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<p><b>Septic Failure</b></p> <p>Damaged septic tanks leak untreated sewage to the surface.</p> <p>Pollute 2 water tokens for each urban card owned</p>	<p><b>Wastewater Treatment</b></p> <p>Remove pollutants before reaching environment and reduces residential runoff.</p> <p>Clean 1 water token on each Urban card</p>	<p><b>Dam</b></p> <p>Dam/reservoir provides recreation and emergency water reserves.</p> <p>Collect 2 clean water tokens and skip your next turn</p>	<p><b>Wetland</b></p> <p>Wetlands filter pollution and provide fish habitat</p> <p>Collect 2 clean water for each Habitat card owned</p>	<p><b>Wastewater Treatment</b></p> <p>Remove pollutants before reaching environment and reduces residential runoff.</p> <p>Clean 1 water token on each Urban card</p>
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**Kissimmee River**



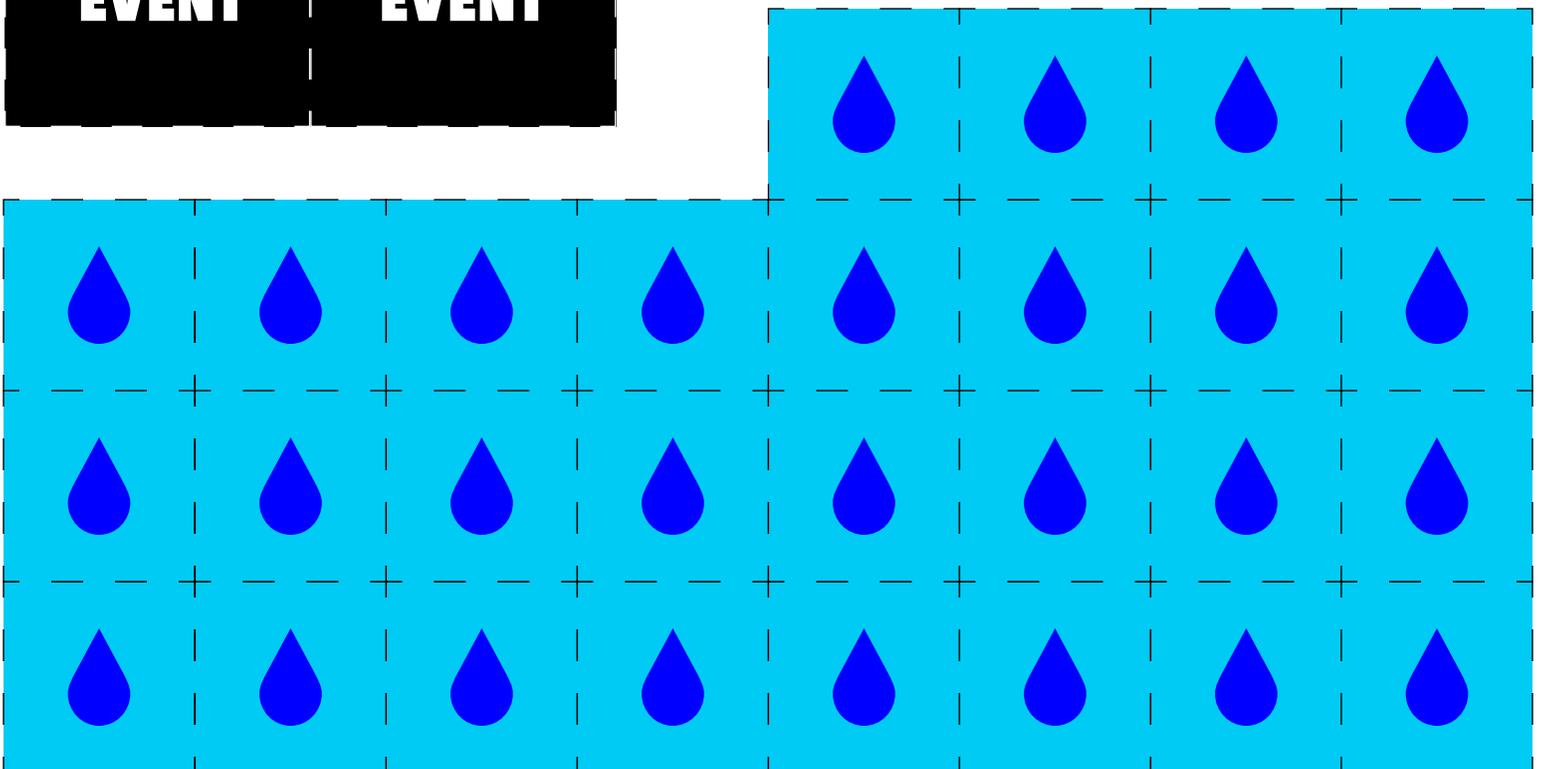
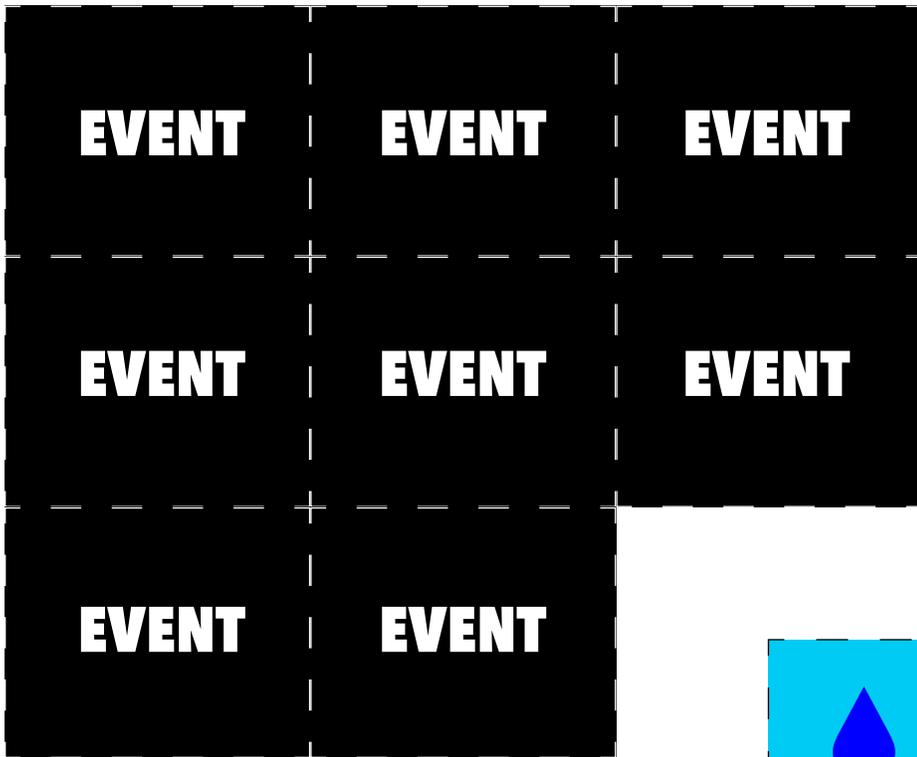
**Chicago River**



**Columbia River**



**Susquehanna River**



### Wildfire in Oregon

Wildfires affect soil quality and increase surface runoff which carries debris, sediment, and pollutants into waterways.

Roll die.

- Roll 1: Add 1 polluted water
- Roll 2-4: Pollute 1 clean water
- Roll 5-6: Pollute 2 tokens

**Columbia River**

### Snowstorm in Chicago

Blizzards frequently strike Chicago and northern Illinois and Indiana in the winter months and can dump around 20 inches of snow on the city, like this one in 2015, nicknamed "The Super Bowl Blizzard." Road de-icing during winter weather releases salt and sediments into waterways.

Roll die.

- 1-3: Add 2 polluted water
- 4-6: Add 3 polluted water

**Chicago River**

### Lake Okeechobee Algae Bloom

An algae bloom grew from May to July in 2016 to cover 85 square kilometers (33 square miles) of Florida's Lake Okeechobee caused by runoff and water temperatures affecting water quality downstream all the way to the Atlantic Ocean.

Roll die:

- 1: Pollute 1 water
- 2-4: Pollute 2 water for every farm
- 5-6: Pollute 1 water for every urban

**Kissimmee River**

### Sediment in the Chesapeake

Strong thunderstorms on Halloween 2019 in central PA caused downpours with rainwater runoff picking up sediment from farmland and carrying the sediment-rich water down the Susquehanna River and on into the Chesapeake Bay.

Roll die.

- 1-4: Pollute 1 water for every farm
- 5-6: Pollute 2 water for every farm
- 6: Pollute 3 clean

**Susquehanna River**

#### INNOVATION

Xeriscaping: Yards and gardens need very little water.

Urban costs 1 less Water

#### INNOVATION

Bioswales: Vegetated storm water channels filter pollutants.

Cancels Residential Runoff

#### INNOVATION

Constructed Wetland: Mimics natural wetlands to clean wastewater.

Cancels Industrial Waste

#### INNOVATION

Crop Rotation: Farms cycle crops to reduce fertilizer.

Cancels Agricultural Runoff

#### INNOVATION

Permaculture: Farms mimic natural ecosystems.

Farm costs 1 less Water

#### INNOVATION

Industrial Wastewater Recycling: Factories capture and recycle wastewater.

Industry costs 1 less Water

#### INNOVATION

Aquaponics: Water circulated between fish farms and aquatic crops.

Farm costs 1 less Water

#### INNOVATION

Fish ladders: Allows passage of migrating fish through dams.

Cancels "Skip a turn"

